MISCELLANEOUS PHENOMENA

Mirage off Farallon.—On the afternoon of February 26, 1926, when in vicinity of Piedras Blanco's Light and to north of it, a very noticeable mirage was in effect to the northwestward and inshore. Ships and shoreline were distended in various grotesque shapes, and visibility greatly increased. Heat waves could be seen plainly rising from the water; upper atmosphere exceptionally clear. When below Pigeon Point, the Farallon Islands Light showed above horizon as two distinct lights, one above the other, for an hour, then disappeared, and did not show again until within its limit of visibility. Distance seen 45 miles at pickup.—*Communicated by American S. S. "H. M. Storey," New York to San Pedro.*

Haze off Australian coast.—The haze observed on the 17th, 18th, and 19th of February was caused by the bush fires then raging over hundreds of miles of land in Australia. It was first observed when the Australian coast was over 900 miles distant, and became more dense as we approached the land. The haze was of a reddish color, and on the 19th it completely obliterated the horizon, and gave the sun the appearance of a red ball at noon.—*From report by British S. S. "Tahiti," Papeete to Sydney.*

DETAILS OF THE WEATHER IN THE UNITED STATES

GENERAL CONDITIONS

The weather of the current month was characterized by abnormally high temperature, especially in the Northwest and by temperature above normal elsewhere in the United States, except in New England—see Chart III of this REVIEW.

The warm weather was probably closely related to the atmospheric pressure distribution over the northeastern Pacific and contiguous land areas over which it was considerably below the normal.

Incursions of cold air from high latitudes were, therefore infrequent and of short duration.

Cyclonic storms passing over the Atlantic in the neighborhood of the Canadian Maritime Provinces had a tendency to greatly increase in intensity as in the previous month. The usual details follow.—*A. J. H.*

CYCLONES AND ANTICYCLONES

By W. P. DAY

Twenty low-pressure areas were plotted during the month, seven of which were of the so-called Alberta type. These Alberta storms, however, could generally be traced back across the Pacific Ocean to southeastern Asia. The remaining LOWS moved inland from the Pacific or originated over the South and Southwest. The latter type developed into important storms east of the Mississppi River.

The 15 HIGHS were about equally divided between the oceanic type moving inland from the Pacific and the continental type moving southward from Canada. None of these HIGHS, however, was important.

FREE-AIR SUMMARY

By V. E. JAKL

Free-air temperatures were above normal at all aerological stations, except due west, where they were about normal. (See Table 1.) The excess over normal increased in general from southern to northern stations, but was most pronounced in the northwest, as shown by Drexel and Ellendale. At those stations the departure was between 4 and 5 degrees above normal in about the first 1,000 meters altitude, but diminished thence upward until nearly normal temperatures were recorded above 3,000 meters. Over Broken Arrow, Groesbeck, and Royal Center the departure was about uniform with altitude and was greatest over Broken Arrow. The large excess over normal and its diminution with altitude in the upper levels over Drexel and Ellendale may be attributed to a less than usual frequency of cold waves over these stations, a characteristic of which, over northwestern sections, is to cause inverted lapse rates or at least an approximately isothermal state to considerable altitudes.

Relative humidities, as usually the case with temperatures above normal, were in general below normal. This departure was more especially evident in the upper levels, although departures at no station were pronounced enough to show any significant relation with other free-air conditions.

Free-air resultant winds were of about normal direction, being nearly west at all stations and at practically all altitudes. (See Table 2.) The general tendency, however, was for a slight north component, although over Ellendale the winds were quite decidedly northwest, except that in the lower levels where the positive temperature departure was greatest the winds were west-northwest, instead of the normal northwest direction. In the lower levels at a number of stations, particularly the more southerly, there was a slight south component.

It is significant of the rapid movement of HIGHS and LOWS, which continued from the previous month, that the free-air movement was stronger than normal, and that the resultants not only showed a general west direction, but that wind directions from day to day showed comparatively few exceptions to a west component for all stations and altitudes. Easterly winds in fact were almost entirely absent, only Key West showing pronounced east component to any considerable altitude, and that on only a few days. Resultant velocities were generally above normal throughout the vertical extent of observations at all stations. This was noticeably the case over Due West in the upper levels, where velocities were in excess of the normal as well as greater than those at any other station. Incidentally, Due West has in the upper levels the highest normal velocities for February of all the stations.

An example of some of the high velocities observed during the month is given by the records of the 25th, when the deep LOW centered over Chicago was effective in giving high velocities aloft to stations as remote from the center as Broken Arrow, Due West and Groesbeck, where winds from a general westerly direction ranging from 37 to 44 meters per second were recorded at various altitudes from 1,800 to 5,200 meters. This LOW had its effect on velocities aloft in the United States even after its center had passed east of Newfoundland on the 27th, as shown by observations on that date at Broken Arrow, Drexel, Due West, Ellendale, Madison, and Royal Center. The maximum free-air velocities recorded at these stations are approximately indicated by those reported from the extreme stations, Due West and Ellendale, which ranged from 53 meters per second from the west-northwest at 6,500 meters, to 31 meters per second from the northwest at 4,000 meters, respectively.

The occasional extreme stratification of the air attending inversions in the lower levels, characteristic of the northern stations in the winter season, was shown at Ellendale several times during the month by the occurrence of a mirage or looming phenomenon. A description of the more pronounced one occurring on the morning of the 13th is given in the following extract from the report from that station:

Low-lying dense fog occurred with Ci. St. and A. St. clouds at 7:30 a. m. The surface wind was almost calm and it was necessary to carry out the head kite 600 meters in order to launch it into a sufficiently strong wind aloft to support it. The land slopes downward about 10 meters in the distance of 600 meters to which the kite was carried, and the kite instrument record shows that at this distant point the temperature was about 5° lower than at the reel house, where the temperature was −4.5°. The record further shows that immediately the kite was launched, the temperature rose rapidly the first few hundred meters. A little later when the dense fog had thinned to light fog an interesting mirage was observed. A grove of trees about 2,700 meters east of the reel house was visible at the top of the fog, probably about three times their height above the ground. The trees could not be seen through the fog on the ground but the upper third of their height was seen ranging along the top of the fog layer. Another solitary tree about three miles southeast of the station was also observed in the same manner. This is the first time that relatively close objects have been observed in mirage; on other occasions distant objects only have been observed in connection with a low-lying smoke layer.

The free-air conditions on this date are shown in the following table:

Altitude, m. s. l.	Temperature	Relative humidity	Wind	
			Direction	Velocity
Meters	° *C.*	*Per cent*		*M. p. s.*
Surface (444)	−4.5	98	NW	0.9
819	−0.1	82	NW	8.5
1,744	−6.0	75	NW	13.7
1,870	−4.6	53	NW	13.4
2,750	−9.9	29	NW	9.9
3,100	−12.9	36	WNW	14.4

This record, while not showing as pronounced a temperature inversion as is often observed, nevertheless indicated a sharp stratification. This may be inferred from the circumstance of rapid change in wind from nearly calm at the surface to strong wind in the first few hundred meters; also from the temperature change in a difference of ten meters altitude mentioned in the description.

TABLE 1.—*Free-air temperatures, relative humidities, and vapor pressures during February, 1926*

TEMPERATURE (° C.)

Altitude m. s. l.	Broken Arrow, Okla. (233 *meters*)		Drexel, Nebr. (396 *meters*)		Due West, S. C. (217 *meters*)		Ellendale, N. Dak. (444 *meters*)		Groesbeck, Tex. (141 *meters*)		Royal Center, Ind (225 *meters*)	
	Mean	Departure from 8-yr. mean	Mean	Departure from 11-yr. mean	Mean	Departure from 5-yr. mean	Mean	Departure from 9-yr. mean	Mean	Departure from 8-yr. mean	Mean	Departure from 8-yr. mean
Meters												
Surface	6.1	+0.9	0.7	+4.2	8.5	0.0	−5.2	+4.3	11.1	+0.7	−0.8	−0.8
250	6.1	+1.0			8.4	+0.1			10.9	+0.8	−1.0	+0.8
500	5.8	+1.8	0.7	+4.5	7.3	+0.3	−5.3	+4.2	10.6	+1.4	−2.8	+0.8
750	5.6	+2.4	0.8	+4.8	6.1	+0.1	−4.8	+4.3	10.3	+1.4	−3.4	+0.9
1,000	5.9	+2.9	1.0	+4.4	5.1	−0.1	−3.9	+4.5	10.0	+1.3	−3.2	+1.3
1,250	5.4	+2.7	0.6	+3.5	4.3	0.0	−3.3	+4.6	9.4	+1.3	−3.2	+1.8
1,500	4.4	+2.4	0.3	+3.3	3.3	−0.1	−3.4	+4.4	8.8	+1.4	−3.6	+1.8
2,000	2.7	+2.2	−2.2	+2.1	1.1	−0.5	−5.8	+3.3	6.5	+1.1	−5.2	+1.4
2,500	0.3	+2.2	−5.1	+1.4	−1.0	−0.2	−9.0	+2.3	3.9	+0.8	−7.6	+0.8
3,000	−2.1	+2.4	−8.2	+0.9	−2.8	+0.1	−11.7	+2.2	1.1	+0.4	−9.9	+0.9
3,500	−4.5	+2.5	−11.3	+0.5	−4.6	+0.9	−14.3	+2.3	−1.6	+0.2	−12.4	+1.1
4,000	−7.5	+2.2			−8.0	+0.6	−18.1	+1.1	−4.4	−0.1	−15.7	+1.0
4,500	−10.3	+2.4							−6.6	+0.1		
5,000	−12.6	+2.8							−8.1	+1.5		

RELATIVE HUMIDITY (%)

Surface	68	0	76	−1	67	0	82	0	68	−5	78	0
250	68	0			67	0			65	−6	78	0
500	63	−2	72	−3	64	0	81	0	59	−8	79	+1
750	57	−4	65	−5	60	−2	75	0	53	−10	78	+3
1,000	47	−9	59	−5	56	−4	68	−2	46	−12	71	+1
1,250	43	−9	55	−5	53	−6	62	−4	41	−14	64	−2
1,500	41	−9	49	−8	52	−6	58	−4	35	−16	60	−2
2,000	32	−13	46	−7	51	−5	53	−6	32	−14	56	−1
2,500	29	−14	46	−6	50	−5	50	−9	32	−11	57	+1
3,000	29	−12	45	−7	40	−10	46	−12	35	−7	58	+1
3,500	27	−13	49	−3	18	−27	43	−13	37	−3	56	−2
4,000	27	−13			22	−29	49	−6	36	−1	56	−4
4,500	27	−13							42	+11		
5,000	27	−13							57	+26		

VAPOR PRESSURE (*mb.*)

Surface	6.60	+0.39	4.89	+0.98	7.64	−0.36	3.43	+0.77	9.27	−0.37	4.54	+0.08
250	6.54	+0.38			7.53	−0.35			8.90	−0.29	4.48	+0.09
500	5.65	+0.24	4.59	+0.88	6.74	−0.30	3.35	+0.74	7.98	−0.27	3.97	+0.10
750	4.87	+0.11	4.04	+0.69	5.87	−0.60	3.15	+0.71	6.93	−0.56	3.69	+0.16
1,000	4.16	−0.08	3.64	+0.50	5.04	−0.98	2.95	+0.58	5.90	−0.78	3.42	+0.19
1,250	3.61	−0.20	3.28	+0.30	4.48	−1.04	2.79	+0.50	4.98	−0.98	3.22	+0.33
1,500	3.26	−0.19	2.96	+0.20	4.05	−0.99	2.61	+0.47	4.06	−1.09	2.93	+0.35
2,000	2.38	−0.34	2.36	+0.05	3.30	−0.78	1.97	+0.19	3.24	−0.74	2.40	+0.32
2,500	1.96	−0.30	1.94	+0.02	2.66	−0.65	1.45	−0.01	2.58	−0.63	2.06	+0.34
3,000	1.70	−0.14	1.56	−0.02	1.74	−0.32	1.09	−0.04	2.20	−0.52	1.76	+0.35
3,500	1.43	−0.08	1.33	+0.06	0.39	−1.58	0.81	−0.04	1.82	−0.43	1.57	+0.48
4,000	1.22	−0.02			0.17	−1.58	0.62	−0.05	1.36	−0.42	1.47	+0.62
4,500	1.12	+0.09							1.13	−0.06		
5,000	0.66	−0.05							1.20	+0.26		

TABLE 2.—*Free-air resultant winds (m. p. s.) during February, 1926*

Altitude m. s. l. (meters)	Broken Arrow, Okla. (233 meters)				Drexel, Nebr. (396 meters)				Due West, S. C. (217 meters)				Ellendale, N. Dak. (444 meters)				Groesbeck, Tex. (141 meters)				Royal Center, Ind. (225 meters)			
	Mean		8-year mean		Mean		11-year mean		Mean		5-year mean		Mean		9-year mean		Mean		8-year mean		Mean		8-year mean	
	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.
Meters																								
Surface	S. 81°W.	1.1	N.31°W.	0.6	S. 72°W.	2.5	N.73°W.	1.4	S. 78°W.	4.0	S. 84°W.	2.0	N.63°W.	1.3	N.45°W.	3.2	S. 63°W.	2.0	S. 80°W.	0.6	N.88°W.	2.3	S. 81°W.	2.0
250	S. 79°W.	1.1	N.37°W.	0.5					S. 78°W.	4.5	S. 85°W.	2.2					S. 62°W.	2.8	S. 69°W.	0.9	N.88°W.	2.5	S. 80°W.	2.2
500	S. 55°W.	2.2	S. 73°W.	0.7	S. 77°W.	4.9	N.79°W.	2.2	S. 78°W.	8.0	S. 84°W.	3.9	N.82°W.	1.8	N.48°W.	3.5	S. 60°W.	4.7	S. 47°W.	1.8	S. 78°W.	4.4	S. 69°W.	3.9
750	S. 62°W.	3.5	S. 63°W.	1.8	S. 86°W.	7.4	N.75°W.	4.2	S. 79°W.	9.7	S. 80°W.	5.5	N.78°W.	4.2	N.57°W.	4.6	S. 63°W.	5.5	S. 53°W.	2.5	S. 78°W.	6.3	S. 69°W.	5.6
1,000	S. 76°W.	3.8	S. 72°W.	2.6	N.82°W.	9.4	N.68°W.	5.5	S. 88°W.	11.3	S. 82°W.	6.5	N.66°W.	5.3	N.55°W.	5.3	S. 65°W.	6.4	S. 64°W.	3.7	N.88°W.	8.0	S. 76°W.	6.9
1,250	N.81°W.	5.2	N.87°W.	3.7	N.76°W.	9.6	N.67°W.	6.8	N.89°W.	12.3	S. 84°W.	7.9	N.61°W.	6.4	N.56°W.	6.3	S. 73°W.	7.8	S. 73°W.	4.8	N.82°W.	8.0	S. 83°W.	7.9
1,500	N.88°W.	6.5	N.84°W.	4.6	N.72°W.	11.2	N.66°W.	8.4	N.88°W.	13.7	S. 86°W.	9.8	N.57°W.	7.5	N.58°W.	7.4	S. 75°W.	8.4	S. 78°W.	6.2	N.74°W.	8.4	S. 88°W.	9.2
2,000	N.82°W.	8.7	N.78°W.	6.9	N.71°W.	12.6	N.68°W.	10.6	N.83°W.	16.4	S. 89°W.	12.9	N.60°W.	9.7	N.62°W.	9.6	N.82°W.	9.6	S. 87°W.	7.6	N.66°W.	10.6	N.87°W.	11.1
2,500	N.78°W.	9.6	N.77°W.	7.8	N.73°W.	15.1	N.70°W.	13.0	N.81°W.	17.9	S. 88°W.	14.4	N.60°W.	12.2	N.63°W.	11.8	N.87°W.	10.4	S. 88°W.	8.7	N.66°W.	11.2	N.86°W.	13.2
3,000	N.76°W.	10.2	N.78°W.	9.8	N.71°W.	16.2	N.74°W.	14.6	S. 89°W.	19.9	S. 86°W.	16.4	N.62°W.	13.6	N.66°W.	13.1	N.74°W.	13.2	S. 88°W.	10.6	N.74°W.	12.1	N.88°W.	14.2
3,500	N.70°W.	12.4	N.67°W.	11.1	N.70°W.	20.6	N.74°W.	16.2	S. 82°W.	21.4	N.87°W.	17.3	N.63°W.	14.9	N.68°W.	13.2	N.84°W.	11.7	N.88°W.	11.2	N.78°W.	12.0	N.86°W.	16.1
4,000	N.75°W.	13.8	N.72°W.	11.7	N.54°W.	24.8	N.78°W.	16.4	S. 83°W.	21.7	S. 89°W.	15.2	N.65°W.	17.2	N.66°W.	14.2	N.78°W.	11.9	N.88°W.	12.2	S. 74°W.	7.8	S. 87°W.	14.5
4,500	N.85°W.	13.5	N.71°W.	12.3					N.78°W.	23.2	N.87°W.	17.8	N.68°W.	16.0	N.66°W.	15.4	S. 83°W.	14.3	N.82°W.	12.9	S. 45°W.	22.0	S. 77°W.	17.2
5,000	N.82°W.	13.8	S. 87°W.	12.6													S. 67°W.	13.1	N.62°W.	9.6				

TABLE 3.—*Mean free-air temperatures, relative humidities and vapor pressures; and resultant winds during February, 1926, at Washington, D. C.*

Altitude m. s. l.	Naval Air Station, D. C. (7 meters)			Weather Bureau (34 meters)	
				Wind	
	Temperature	Relative humidity	Vapor pressure	Direction	Velocity
Meters	° *C.*	*Per cent*	*Mb.*		*M. p. s.*
Surface	0.3	78	4.99	N. 50° W.	1.7
250	0.1	74	4.68	N. 67° W.	4.4
500	−0.1	70	4.30	N. 65° W.	6.9
750	−1.1	69	3.94	N. 62° W.	8.8
1,000	−2.2	69	3.63	N. 67° W.	9.3
1,250	−3.4	70	3.38		
1,500	−4.0	68	3.14	N. 56° W.	13.2
2,000	−4.7	63	2.67	N. 61° W.	16.3
2,500	−6.4	58	2.17	N. 57° W.	18.2
3,000	−8.9	54	1.65	N. 55° W.	19.2
3,500	−12.2	54	1.31	N. 47° W.	17.0
4,000	−15.9	53	0.92	N. 68° W.	17.0
4,500	−19.3	54	0.53	N. 45° W.	16.0

THE WEATHER ELEMENTS

By P. C. DAY, In Charge of Division

PRESSURE AND WINDS

The distribution of the atmospheric pressure resembled that of the preceding month, moderately high pressure over the Plateau region, diminishing eastward, with distinctly low pressure, on the average, over the North Atlantic coast and the Canadian Maritime Provinces.

Only a few of the cyclones developed into important storms over the interior districts, but a number increased markedly in proportion as they approached the Atlantic coast, several becoming storms of great severity over the southern New England coast, attended by unusually low barometric pressure and winds of gale force.

One of the most important of these had its origin near the coast of northern California, where it appeared on the morning of January 31, whence it progressed southeasterly to the Texas coast by the morning of the 3d. From that point it moved rapidly northeastward to southern New England by the morning of the 4th with greatly increasing intensity and rapidly falling pressure, and during the following 24 hours continued its northeastward course toward the Grand Banks with pressure only slightly above 28.5 inches.

A second storm, of much shorter path but developing great severity, moved from the Carolina coast to southern New England on the 9th and 10th and thence northeastward with barometric pressure only slightly above 29.0 inches.

A third storm, pursuing a course similar to that at the first of the month, advanced southeastward from the Oregon coast and was central over southwestern Missouri on the morning of the 18th, whence it moved northeastward to southern New England during the following 24 hours as a storm of wide extent and general precipitation over the eastern third of the country. This storm continued its northeasterly course with increasing intensity, the pressure falling below 29 inches on the morning of the 20th.

The only important storm over the Great Lakes had its origin in the Southwest and was central over northern Texas on the morning of the 24th, whence it moved to southern Lake Michigan by the following morning, increasing greatly in intensity, the barometer falling below 29 inches at the center. This storm moved to the Canadian Maritime Provinces during the following 24 hours, and was attended by moderate to heavy precipitation from the Great Plains eastward, with snow over northern districts and high winds over portions of the Great Lakes and near-by areas.

Important anticyclones were notably absent during the month, but several of moderate strength finally reached the southern States attended by sharp changes in temperature.

The average pressure for the month was mainly lower than normal, except over the Southwest. From the upper Missouri Valley and the Canadian Northwest Provinces eastward and southeastward to the Atlantic coast the average pressure was from 0.10 to 0.25 inch below normal, a few stations in New England reporting the lowest average pressure of record for February.

Over all parts of the country, save for a small area near Lake Superior, the averages of pressure were lower than those for January, the deficiencies being comparatively large over the far Northwest and along the middle Atlantic coast.

On account of the persistence of low pressure over eastern districts the prevailing winds had a distinct westerly or northwesterly trend from the Missouri Valley eastward and southeastward to the Atlantic coast, becoming more northerly in portions of the Great Lakes region and New England.

Over the southern plains the winds were mainly from southerly points, and similar directions prevailed in the far Northwest.

High winds prevailed over the Pacific coast districts for several days near the beginning of the month and they were high along the Atlantic coast on the 3d and 4th, 10th and 11th, and 19th and 20th. From the 24th to 26th high winds prevailed over much of the Ohio and lower Mississippi Valleys and the southern portions of the lower Lake region and thence to New England. A table at the end of this section gives details of the more important local storms.

TEMPERATURE

The marked feature of the weather was the unusual warmth that prevailed over the greater part of the country, and particularly its uniformity over the central and western districts, a condition that likewise prevailed over large portions of the same territory during the two preceding months. At a number of points in the area from the upper Mississippi Valley westward to the Pacific the daily temperatures were normal or above on every day of the month, and over the greater part of this area there were not more than one or two days with temperature below normal. Not only were the temperatures far above normal, but at some of the most northerly points, the temperature did not fall below zero. At Havre Mont., usually one of the coldest stations in the country, the lowest temperature was 6° above zero, a record not observed in any previous February.

At many points in the Missouri Valley and thence west to the Pacific the average temperature was the highest of record for February, and in a number of instances the combined average of the three winter months shows the winter of 1925–26 as the warmest of record.

In the Canadian districts adjacent to Montana and North Dakota the monthly means were likewise as high as those previously referred to, but high temperatures probably did not extend northward as far as in January. At Eagle, Alaska, where the January average was nearly 30° above normal that for February was apparently less than 1° above, due mainly to marked cold during the